Ecology:

Abiotic:

Ex. Water:

Problems: aquatic organisms:
Terrestrial organisms:

Temperature:

Wind:

Solar energy:

Biotic:

Hierarchy of organization: Review
1. atoms
2. molecules
3. cells
4. tissues
5. organs
6. organ systems

Where ecology covers in the hierarchy:
7. Organism:

8. Populations:

9. Community:

10. Ecosystems:

Biomes: (p. 689; Fig. 34.9)

Distribution of biomes: a)
    b)
    c)
Ex. Tropical forest, savanna, desert, polar, chaparral, temperate grassland, temperate deciduous forest, coniferous forest, tundra
Biosphere:

Why could this not be considered a global community?

Population Dynamics:

What's a Population?

Population density:

How population density is estimated:

1) Ex.

2) 

\[ N = \text{marked individual} \times \text{total catch \ 2}\text{nd time} \]

Recaptured marked individuals

Dispersion pattern:

1) Clumped:

Ex.

2) Uniform:

Ex.

3) Random:

Most populations are distributed as either:

Population Growth:

Demography:

Look at:

Two important demographic factors:

1) Age structure:

2) Sex ratio:

Generation time:

Fecundity:

Reproductive base:
Types of Population Growth:

Exponential Growth:

\[ G = rN \]

where:
- \( G \) = growth rate of a population
- \( N \) = number of individuals in the population
- \( r \) = intrinsic rate of increase (birth – death: rough estimate)

Logistic Growth:

\[ G = \frac{rN (K - N)}{K} \]

where:
- \( G \) = growth rate of a population
- \( N \) = number of individuals in the population
- \( r \) = intrinsic rate of increase (birth – death: rough estimate)
- \( K \) = Carrying capacity

What is the Carrying Capacity (\( K \))? 

When \( N \) = almost 0, then what is happening to this population?

When \( N \) = almost \( K \), then what is happening to the population?

When \( N \) = \( K \), then what is happening to the population?

Factors that limit population growth:

1) Density dependent factors:

   ex.

2) Density Independent factors:

   Ex. Climate, weather & environmental factors
**Boom and Bust Species**: (p. 705; Fig. 35.5)

**Boom**:

**Bust**:

Possible explanations for boom and bust:

1) Time lag:
   - Ex. snowshoe hare & Canadian lynx

2) Endocrine cycle:

**Survivorship curves**:

**Type I survivorship**:
- Ex. Humans, whales, elephants

**Type II survivorship**:
- Ex. Some invertebrates, gray squirrels

**Type III survivorship**:
- Ex. Insects, mussels

**Life History is shaped by evolutionary events**:

**Life history**:

4 major traits that affect life histories:

1)  
2)  
3)  
4)
Two types of Life History Strategies:
1) Opportunistic or r-selected species

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Ex.

What type of survivorship curve do opportunistic species exhibit?

2) Equilibrial or k-selected species:

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What type of survivorship curve do equilibrial species exhibit?

Which of these strategies would probably be more favorable in an unstable environment? Why?

**Human Population**:  
Currently:

**Age Structure**: (p.710; Fig. 35.9A)  
3 main age groups: broken into 5 year age groups

1) 0 - 14  
2) 15 - 45  
3) 45+
What type of growth does the human population exhibit?

What are some reasons for the increase in growth?

What is Zero Population Growth (ZPG)?

Ways in which the human population can reach ZPG:
   1) Limit the number of offspring per couple
       2) Delay reproduction (late 20's instead of early 20's)